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Production of hydrogen rich gas from tea waste

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Hydrogen is an energy carrier, which stores and delivers energy and produced from fossil fuels and renewable energy sources such as biomass, wind, solar, geothermal, and hydroelectric power to split water. Biomass gasification is a process in which biomass is converted into gaseous components by applying heat in the presence of air/oxygen and steam. Within the scope of this study, tea waste was gasified in the presence of Ni-CeO_2/Al_2O_3 catalysts using air as gasifying agents. The Ni-CeO_2/Al_2O_3 catalyst was synthesized by the co-impregnation method and characterized by XRD, XRF, SEM and BET techniques. The effect of gasification parameters such as temperature (650, 850°C), CeO_2 loading (0-40 wt.%) at constant 3 L/h air flow rate, on the gaseous product distribution was examined. The main gas components were determined as H_2, CH_4, CO, and CO_2 by micro gas chromatography analyzer. The maximum H_2 content of the gas mixture was achieved as 5.98 mol H_2/kg tea waste at 850°C, 15 min., 20% catalyst ratio and 3 L/h air flow rate in the presence of Ni-CeO_2/Al_2O_3 contained 40% CeO_2.

Biography

Nezihe Ayas is a doctor of chemical engineering, a professor at Anadolu University, Faculty of Engineering, Department of Chemical Engineering. She is Head of Unit operations and Thermodynamics Division, supervisor of biofuel laboratory at Chemical Engineering Department. She has an experience in research of biofuel, gasification of biomass, hydrogen production from biomass, catalyst synthesis for biofuel and hydrogen production. She is an author and a co-author of several publications related renewable energy such as biodiesel, hydrogen from biomass in supercritical water gasification, hydrogen from biomass by gasification and steam reforming, catalyst synthesis for hydrogen production. She teaches students in the fields of Thermodynamics, Mass Transfer, Obtaining hydrogen from biomass, and others.

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